



ILWS Theory and Modeling Task Group

- development update -

Michael Hesse



Process:

- Chair nominated by STC (M. Hesse, done)
- Draft charter created (done)
- Charter approved/modified by ILWS STC (open)
- TG member list from chair to STC (open)
- TG member invitation, form TMTG (open)
- Initiate WG activities

Charter for Theory and Modeling Task Group
within the
International Living With a Star program



Today, theory and modeling play a critical role in our quest to understand the connection between solar eruptive phenomena, and their impacts in interplanetary space and in the near-Earth space environment. This new role is based on two developments, one related to the goal of basic physical understanding, and the other to space weather-related applications.

When targeting physical understanding, our focus is shifting away from investigations aiming at basic discoveries, to missions and studies that address our basic understanding of processes we know to be important. For these studies, theory and models provide physical explanations that need to be verified or falsified by empirical evidence. Within this paradigm, a much more tight integration between theory, modeling, and space flight mission design and execution is not only beneficial, but essential.

One of the prime objectives of space weather research, on the other hand, is the prediction of space environmental conditions for the benefit of humans and their assets in near-Earth space and on the ground, as well as on solar system bodies like Mars that are of interest to exploration by humans. By its very nature, prediction requires modeling, which, in turn, requires understanding.



The Theory and Modeling Task Group (TMTG) within the International Living With a Star (ILWS) program has as its objectives to provide recommendations to the ILWS steering committee. The TMTG will focus on the role theory and modeling can play in furthering ILWS success, and on the integration of theory and modeling into ILWS activities, both on the basic science side and in the space weather domain.

Specifically, the TMTG shall provide recommendations and information to the steering committee on:



- The current state of capability in Sun-Earth-connection modeling
- Greatest developmental needs in space environment modeling
- Research investment targets for the creation of greater space weather capabilities
- Theory and modeling response to immediate needs, such as to those of human exploration
- Integration of ILWS missions and theory and modeling
- Enhancing theory and modeling benefits to the broad, ILWS, science community
- Theory and modeling predictions of interest to ground- or space-based investigation
- Integration of international theory and modeling activities, including the formation of international partnerships and programs